

CLAIMS

1. A phase modulation apparatus that generates a phase modulation signal by performing phase modulation on an input signal, said phase modulation apparatus comprising:
 - 5 a modulation signal generation section that generates a first baseband modulation signal and a second baseband modulation signal based on said input signal;
 - a PLL circuit; and
 - a switching section that switches between having
- 10 said PLL circuit generate a phase modulation signal by performing 1-point modulation, or generate a phase modulation signal by performing 2-point modulation, by switching between inputting said first baseband modulation signal, or inputting said first baseband
- 15 modulation signal and said second baseband modulation signal, to said PLL circuit, according to a communication mode.
2. The phase modulation apparatus according to claim
- 20 1, further comprising a determination section that performs a comparative determination of a size relationship of a modulation bandwidth corresponding to a communication mode and a bandwidth of said PLL circuit,
- wherein said switching section performs switching
- 25 according to said control signal.
3. The phase modulation apparatus according to claim

2, wherein:

said determination section sends a control signal to a loop filter that is a component of said PLL circuit; and

5 said loop filter changes its own resonance frequency based on said control signal sent from said determination section, and changes a bandwidth of said PLL circuit.

4. The phase modulation apparatus according to claim
10 2, wherein said determination section sends said control signal to a reference frequency divider that provides a reference signal to a phase comparator of said PLL circuit and a division ratio generation section that generates a division ratio of said PLL circuit, changes an
15 oscillation frequency of said reference frequency divider and a division ratio of said division ratio generation section, and changes a bandwidth of said PLL circuit.

5. The phase modulation apparatus according to claim
20 2, wherein:

said communication modes are of two kinds, GSM mode and UMTS mode; and

said determination section sends a control signal to said switching section so that 1-point modulation is
25 performed in said GSM mode, and sends a control signal to said switching section so that 2-point modulation is performed in said UMTS mode.

6. The phase modulation apparatus according to claim 2, wherein:

said communication modes are of two kinds, GSM mode
5 and UMTS mode; and

said determination section sends a control signal to said switching section so that 1-point modulation is performed in said GSM mode, and in said UMTS mode, sends a control signal to said switching section so that 2-point
10 modulation is performed, and also sends a control signal to a loop filter and changes a bandwidth of said PLL circuit in a wideband direction.

7. The phase modulation apparatus according to claim
15 2, wherein:

said communication modes are of three kinds, GSM mode, Bluetooth mode, and UMTS mode; and

said determination section sends a control signal to said switching section so that 1-point modulation is performed in said GSM mode; and in said Bluetooth mode,
20 sends a control signal to said switching section so that 2-point modulation is performed, and also sends a control signal to a loop filter and changes a bandwidth of said PLL circuit in a wideband direction; and in said UMTS
25 mode, sends a control signal to said switching section so that 2-point modulation is performed, and also sends a control signal to a loop filter and changes a bandwidth

of said PLL circuit further in a wideband direction than in case of said Bluetooth mode.

8. A communication device that incorporates the phase modulation apparatus according to claim 1.

9. A mobile radio device that incorporates the phase modulation apparatus according to claim 1.

10. A phase modulation method that generates a phase modulation signal by performing phase modulation on a transmit signal, said phase modulation method comprising:
a step of performing a comparative determination of a size relationship of a modulation bandwidth of a communication mode and a bandwidth of a PLL circuit;
a step of switching said PLL circuit to 1-point modulation when a modulation bandwidth of a communication mode is narrowband compared with a bandwidth of said PLL circuit, and switching said PLL circuit to 2-point modulation when a modulation bandwidth of said communication mode is wideband compared with a bandwidth of said PLL circuit; and
a step of, when said PLL circuit is switched to 2-point modulation, changing a resonance frequency of a loop filter of that PLL circuit and changing a bandwidth of said PLL circuit in a wideband direction.

11. A phase modulation method that generates a phase modulation signal by performing phase modulation on a transmit signal, said phase modulation method comprising:

5 a step of performing a comparative determination of a size relationship of a modulation bandwidth of a communication mode and a bandwidth of a PLL circuit;

a step of switching said PLL circuit to 1-point modulation when a modulation bandwidth of a communication mode is narrowband compared with a bandwidth of said PLL circuit, and switching said PLL circuit to 2-point modulation when a modulation bandwidth of said communication mode is wideband compared with a bandwidth of said PLL circuit; and

15 a step of, when said PLL circuit is switched to 2-point modulation, changing a reference frequency of that PLL circuit and changing a bandwidth of said PLL circuit in a wideband direction.